

RORIPPA WALTERI AND R. OBTUSA
SYNONYMS OF R. TERES
(CRUCIFERAE)^{1, 2}

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Most manuals treating the vascular plants of the southern and the western United States include both *Rorippa walteri* (Elliott) Mohr and *Rorippa obtusa* (Nuttall in Torrey and Gray) Britton as two distinct and taxonomically valid species. My studies show that both names are based on types that belong to the same species. Furthermore, neither of these names can be maintained since there is an older valid name in the literature which has heretofore not been considered to belong in the genus *Rorippa*. Therefore, *R. walteri* and *R. obtusa* fall into synonymy under a new combination in *Rorippa* based on the name *Cardamine teres* Michaux.

The nomenclatural bibliography of this species is as follows:

RORIPPA **teres** (Michaux) Stuckey, comb. nov.

Cardamine teres Michaux, Fl. Bor. Am. 2: 29. 1803.

("Hab [itat] in Nova Anglica." Holotype: "Etat de Vermont Lac Champlain," s.d., [A. Michaux s.n.], P. Photo at GH! Isotype, GH!)

Sisymbrium tanacetifolium? [sensu] Walter, Fl. Carol. 174. 1788. Non Linnaeus 1753.

[No specimen is cited. If any of Walter's specimens are extant, they would be at BM.]

Nasturtium palustre ("Leysser" [Linnaeus]³ A. P. DeCandolle delta? *tanacetifolium* (Walter) A. P. DeCandolle, Syst. Nat. 2: 192. 1821.

Sisymbrium walteri Elliott, Sketch 2: 145. 1824.

[A substitute name for *Sisymbrium tanacetifolium* Walter. Elliott's specimen⁴ was originally labeled by him as "Sisymbrium tanacetifolium Walt."]

¹ Modified from a portion of the author's doctoral dissertation, "The Taxonomy and Distribution of the Genus *Rorippa* (Cruciferae) in North America." The University of Michigan, Ann Arbor, xiv + 482 p. 1965.

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³ DeCandolle should have cited Linnaeus instead of Leysser, since the epithet had its origin with Linnaeus rather than with Leysser.

⁴ SOUTH CAROLINA: [Probably CHARLESTON CO.]: ["Common around Charleston and Beaufort," (Elliott, 1824)], in humidis, Flor. Maio, [S. Elliott s.n.], CHARL. Photo GH! NY!

Erysimum walteri (Elliott) Eaton, Man. Bot. N. Am. ed. 5, 213. 1829.
Nasturtium tanacetifolium ("Walter") Hooker and Arnott, Hook. Jour. Bot. 1: 190. 1834.

[Hooker and Arnott cited both Walter and DeCandolle, so the name was evidently intended to be merely a new combination.⁵]

Nasturtium micropetalum Fischer and Meyer, Ind. Sem. Hort. Petrop. 3: 41. 1837.

("Hab [itat] in Americae septentrionalis provincia New Orleans dicta. . ." Type not seen.)

Nasturtium obtusum Nuttall in Torrey and Gray, Fl. N. Am. 1: 74. 1838.

("Banks of the Mississipi [sic] [River]." Holotype: LOUISIANA: [JEFFERSON]: In abundance in the borders of a cultivated field on the western side of the Mississippi [River]—opposite the city of N[ew] Orleans, 2 Mar. s.d., H[enry] Little s.n., PH!)

Sisymbrium ?teres (Michaux) Torrey and Gray, Fl. N. Am. 1: 93. 1838.

Nasturtium walteri (Elliott) Wood, Class Book. 228. 1861.

Cardamine indica (Linnaeus) O. Kuntze delta *tanacetifolia* ("Walter") O. Kuntze, Rev. Gen. 1: 24. 1891.

Cardamine palustris ("Leysser" [Lynnaeus]⁶ O. Kuntze *alpha brevipes* (A. P. DeCandolle) O. Kuntze 2. *obtusum* (Nuttall in Torrey and Gray) O. Kuntze, Rev. Gen. 1: 24. 1891.

Roripa [sic] *obtusum* (Nuttall in Torrey and Gray) Britton, Mem. Torrey Club 5: 169. 1894.

Roripa [sic] *tanacetifolia* ("Walter") Heller, Contr. Herb. Franklin & Marshall College 1: 40. 1895.

Roripa [sic] *walteri* (Elliott) Mohr, Bull. Torrey Club 24: 23: 1897.

Radicula obtusum (Nuttall in Torrey and Gray) Greene, Leaf. Bot. Obs. & Crit. 1: 113. 1905.

Radicula walteri (Elliott) Greene, Leaf. Bot. Obs. & Crit. 1: 114. 1905.

Nasturtium plebejum Polakowsky f. *latifolia* O. E. Schulz, Repert. Sp. Nov. 34: 133. 1933.

("Mexico: chiefly in the valley of the Rio Grande, below Doñana C. C. Parry, J. M. Bigelow, Charles Wright, A. Schott in Mexic[an] Boundary Survey, under the direction of Major W. H. Emory." Holotype: Presumably at B. [In addition to the printed data on the labels as cited by Schulz, I find isotypes as follows: [Probably TEXAS: MAVERICK CO.]: Near Eagle Pass, s.d., [J. M.] Bigelow 27, NY! US!]

The taxonomic position of Michaux's *Cardamine teres* has never been adequately understood. Citing Michaux, A. P. DeCandolle (Syst. Nat. 2: 259. 1821) retained it in *Cardamine*, but asked if it might be a *Nastur-*

⁵ LOUISIANA: [ORLEANS]: New Orleans, 1832, T. Drummond s.n., presumably at K, duplicates at GH! and a probable duplicate is at NY!

⁶ Kuntze also cited Leysser instead of Linnaeus. See footnote 3.

tium. Torrey and Gray (Fl. N. Am. 1: 93. 1838) in questioning its affinities transferred it to *Sisymbrium*. Watson (A. Gray, Syn. Fl. N. Am. 1(1): 149. 1895) and Schulz (Repert. Sp. Nov. 34: 131. 1933) were aware of its proper taxonomic relationship, since they treated it in synonymy under *Nasturtium tanacetifolium* (Walter) Hooker and Arnott, the then commonly accepted name for the species. Critical examination of an isotype and photograph of Michaux's type reveals that the name belongs to those plants of *Rorippa* that have minute yellow petals, vesicular trichomes, pinnately-divided leaves, and decumbent stems, and that grow on the Southern Atlantic and Gulf Coastal Plains of the United States and the coastal lowlands of eastern and western Mexico.

Michaux's original specimen is in the Museum d'Histoire Naturelle, Paris, and a photograph of that specimen and a fragment of possible original material are in the Gray Herbarium of Harvard University. Michaux's material very much resembles plants from South Carolina in having short siliques (ca. 5.0-7.5 mm. long), rather than long siliques (ca. 9.0-17.0 mm. long) which are more common of plants in the western portion of the species range in the United States. An unfortunate situation is that the holotype at Paris is labeled "Cardamine teres Etat de Vermont Lac Champlain." The fragment in the Gray Herbarium contains no habitat or locality data, except a note written by Asa Gray "Never from L. Champlain! Cardamine teres. Michx! Hb. Richard 1839." The Richard mentioned is L. C. Richard who anonymously edited Michaux's *Flora*. Later annotations by Gray include "Nasturtium tanactefolium" [sic] and "Sisymbrium ?teres." I see no problem in accepting this fragment as an isotype. When Michaux described *Cardamine teres* he cited the material as having come from "Nova Anglica." Plants of this species are not known to grow in eastern United States north of South Carolina. The only explanation I can offer for the inconsistent locality information in Michaux's *Flora* and on his specimen at Paris is that either Michaux or someone else associated incorrect habitat and locality data with his plants. It is very possible that the plants came from the neighborhood of Charleston, South Carolina, where Michaux made his headquarters while he was in North America (Michaux, 1889).

Fifteen years before Michaux described *C. teres*, Walter (1788) had identified plants of this taxon as "Sisymbrium tanacetifolium?" Although Walter did not cite Linnaeus, who had described a *S. tanacetifolium* in the *Species Plantarum* of 1753, Walter's use of the question mark is an indication that he was uncertain of the application of the name, rather than that he was proposing a new name. Elliott (1824), who evidently thought Walter's species was distinct from the one of Linnaeus, provided a substitute name, *Sisymbrium walteri*, based on Walter's publication. Elliott's interpretation is considered acceptable since a photograph of the specimen that Elliott labeled as *Sisymbrium walteri* also belongs to



Fig. 1. Photograph of a portion of the holotype of *Nasturtium obtusum* Nuttall in Torrey and Gray. (Henry Little s.n., PH); belongs to *Rorippa teres* (Michaux) Stuckey.

the now understood *R. teres*. Elliott's *S. walteri* was later transferred to *Rorippa* by Mohr (1897), and therefore *R. walteri* was previously considered to be the oldest name for this taxon (Rollins, 1961).

Nasturtium micropetalum Fischer and Meyer (1837) has been considered synonymous with *Nasturtium tanacetifolium* by Hemsley (Biol. Cent. Am. Bot. 1: 29. 1879), Kuntze (Rev. Gen. 1: 24. 1891), and Watson (A. Gray, Syn. Fl. N. Am. 1(1): 149. 1895). Schulz (Repert. Sp. Nov. 34: 134. 1933) placed it in synonymy under *Nasturtium brevipes* (A. P. DeCandolle) Grisebach. The latter name is a synonym of *Rorippa portoricensis* (Sprengel) Stehlé. I have not seen a specimen upon which Fischer and Meyer may have based their name, but it is evident from their description and their citation of the plant's locality as New Orleans, that this taxon also belongs to *R. teres*.

It was disturbing to learn that the holotype of *N. obtusum*, a species published by Torrey and Gray (1838) from Nuttall's manuscript, belongs to *R. teres*. The specimen in the herbarium of the Academy of Natural Sciences of Philadelphia was collected by Henry Little, rather than by Nuttall himself, as is the usual situation with these Nuttall types. The data on this specimen have been written by three different individuals. The date, habitat, and locality data, except the "rleans" of N[ew] Orleans, are all similarly written and believed to be those of the original collector. The collector's name, "H[enry] Little," is added at the bottom of the label in the handwriting of Charles Pickering. The name of the plant, "N. *obtusum Nutt," was written by Thomas Nuttall. Virtually nothing is known of Little's botanical work, but Joseph Ewan (*in litt.*, 11 May 1964) tells me that Little visited in the New Orleans area probably sometime between 1818 and 1827. Little's collections later came into the hands of Charles Pickering, curator of the Academy herbarium from 1827 to 1838, where they were deposited.⁷ At the Academy, Little's specimens were accessible to Nuttall.

Nuttall's own collections taken after 1818, which were used as a basis for most of his descriptions in his manuscript, are, if they exist, considered holotypes and are in the British Museum (Pennell, 1936, p. 45). The specimens at the British Museum which were used by Nuttall as the basis of names in the genus *Nasturtium* were photographed by F. G. Meyer, and I have seen photographs of all of these at the Gray Herbarium, except one.⁸ Conspicuously absent are photographs of any type specimens for *N. obtusum* and *N. limosum*, suggesting that they are not

⁷ A card file in the Academy Herbarium listing donors of plant specimens contains a card with a note stating that Little's Herbarium was presented to the Academy before 1837 by Charles Pickering.

⁸ The one exception is *N. sessiliflorum*, the type of which is at BM, where it was examined for me by Dr. Rogers McVaugh.

⁹ This specimen bears a label prepared in a manner similar to that described above for Little's specimen of *N. obtusum*.

in the British Museum. Both of these species are represented by collections of Henry Little at the Academy. Rogers McVaugh has kindly searched for duplicates of these collections in the British Museum, but he did not find any. It therefore appears that Nuttall did not have any duplicates of these collections when he returned to England with his herbarium, since none have been photographed nor found in the British Museum. We are therefore forced to the conclusion that Henry Little's collections of *N. obtusum* and *N. limosum*⁹ at the Academy are the holotypes for these two species.

N. obtusum was subsequently transferred to *Rorippa* by Britton (1894), and both names have been widely used in the literature for a variable group of plants that have a geographical range primarily from the Mississippi River westward to the Pacific Ocean. In addition, no less than eight taxa (*Rorippa sphaerocarpa* (A. Gray) Britton, *R. alpina* (S. Watson) Rydberg, *R. integra* Rydberg, *R. underwoodii* Rydberg, *R. tenerrima* Greene, *R. curvipes* Greene, and *Radicula sinuata* (Nuttall in Torrey and Gray) Greene var. *integra* Jepson and var. *truncata* Jepson) have been considered synonymous with *Rorippa obtusa*. The latter has been the anchor species on which many varietal combinations involving the above epithets have been made. None of them, however, are synonyms. In this variable group, I recognize four of them (*R. curvipes* Greene, *R. sphaerocarpa* (A. Gray) Britton, *R. tenerrima* Greene, and *R. truncata* (Jepson) Stuckey¹⁰) as distinct species (Stuckey, 1965). An important point is that there are no known records that plants of these four species grow natively at New Orleans, the type locality for *N. obtusum*. The nearest known localities for any plants of these taxa (*R. tenerrima* and *R. truncata*) are the Rio Grande, near El Paso, Texas, and the shore of the Mississippi River at East St. Louis. All of the floristic manuals known to me (those cited in Stuckey, 1965), that report *R. obtusa* as occurring in the plains and mountainous states of the United States west of the Mississippi River are incorrect. Reports by Gates (1940) for Kansas and Steyermark (1963) for Missouri should be referred to *R. truncata*. Steyermark's illustration of *R. obtusa* represents *R. truncata* (p. 759, pl. 185, no. 4). Fassett's (1940) illustration of *R. obtusa* in his *Manual of Aquatic Plants* was evidently drawn from a specimen of *R. curvipes*. To further add to the confusion, these variable plants of the western United States have often been misidentified in herbaria as *R. curvisiliqua* and its varieties and synonyms, *R. sessiliflora*, *R. islandica* and its varieties and synonyms, and *R. sinuata*. East of the Mississippi River, the reports of *R. obtusa* from Michigan (Walpole, 1927), Washing-

¹⁰ ***Rorippa truncata*** (Jepson) Stuckey, comb. nov. Based on *Radicula sinuata* (Nuttall in Torrey and Gray) Greene var. *truncata* Jepson, Man. Flowering Pl. Calif. 424. 1925. (Holotype: CALIFORNIA: [LOS ANGELES CO.]: Crystal Lake—North Fork San Gabriel Riv[er], San Gabriel Mountains, 5500 ft, 19 Jun 1921, Frank W. Peirson 2450, JEPS!) ...

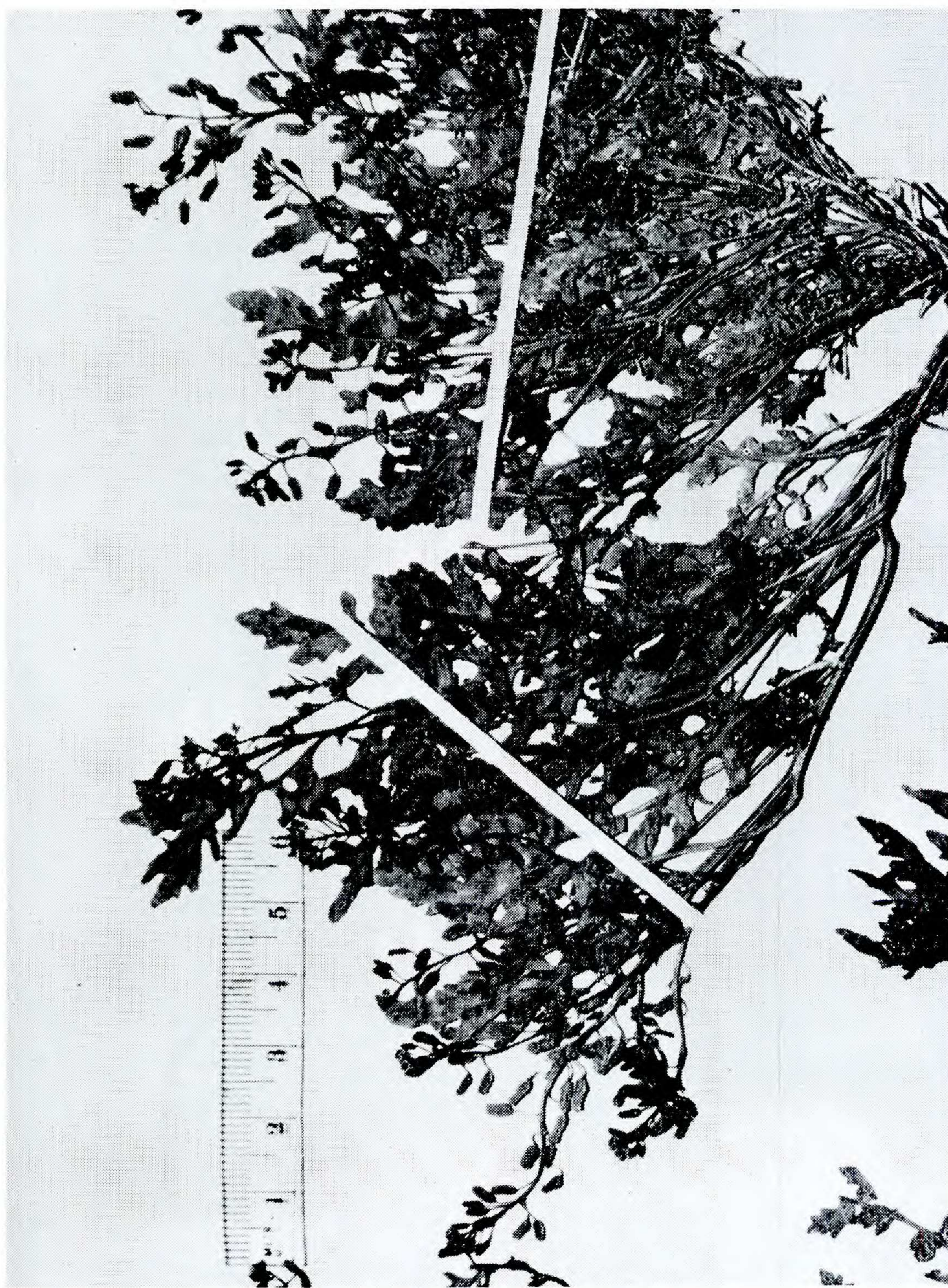


Fig. 2. Photograph of a portion of the holotype of *Radicula sinuata* (Nuttall in Torrey and Gray) Greene var. *truncata* Jepson. (Frank W. Peirson 2450, JEPS); equals *Rorippa truncata* (Jepson) Stuckey.

ton D. C. (Hitchcock and Standley, 1919), and the St. Lawrence River valley (Marie-Victorin, 1930) were based on specimens of *R. islandica*. Deam (1940), Jones and Fuller (1955), and Strausbaugh and Core (1953) correctly excluded *R. obtusa* from the states of Indiana, Illinois, and West Virginia, respectively. All specimens I have seen from these states labeled as *R. obtusa* belong to *R. islandica*. In northern Canada, the plant from the Mackenzie River Delta (Porsild 7225 GH!) and reported by Porsild (1943) as *R. obtusa* is *R. islandica*. Although I have not seen any specimens, reports of *R. obtusa* by Raup (1936 and 1947) also from northern Canada, doubtless should be referred to *R. islandica*. Such anonymous sentences or phrases on herbarium sheets as "There seem to be at least three species passing as obtusa," and "about what is usually taken for obtusum But see Nuttall's type!—quite different in pod," are indicative that there were both taxonomic and nomenclatural problems in the plants we have commonly referred to as *R. obtusa* in the past.

To point out more specifically some of the confusion that has existed in interpreting *R. obtusa*, one only needs to turn to the *Britton and Brown Illustrated Flora* (Gleason, 1952) and look at the drawing of *R. obtusa* on page 241 of volume 2. This drawing portrays two species in one. In the herbarium of the New York Botanical Garden I found the material from which this drawing was made. It is a collection labeled St. Louis, Missouri, by N. Riehl (958) and contains three plants representing three different species. The top specimen, which has long fruits pointed at the apex, is *R. teres*, or similar to the type of *R. obtusa*. From this specimen the artist drew the upper part of the plant consisting of the stem, racemes, and fruits, and the long single fruit at the left of the plant. Two young specimens are contained on the lower part of Riehl's sheet. One of these is *R. tenerrima*; the other is *R. truncata*. It appears that the basal leaves for Gleason's illustration were taken from the plant of *R. truncata*. The enlarged, but short silique to the right of the drawing of the whole plant is a fruit of *R. truncata* evidently drawn from either a specimen collected 11 June 1895 at East St. Louis, Illinois (Letterman s.n. NY!) or one collected from Jackson County, Missouri (Bush 11, NY!). Each one of these sheets bears the stamp "This specimen used for illustration ed 3 Britton & Brown Flora." Gleason was aware of the differences between these two species, but wrote "there seems to be no significant differences between forms with long (4.5-11 mm.) fruits and short (3.3-4.5 mm.) fruits," and so he grouped them together under *R. obtusa*. Nomenclaturally, he correctly interpreted the long-fruited plants as *R. obtusa* since the measurements agree with those of the type of *R. obtusa*. For the short-fruited ones he gave the measurements of *R. truncata*, but he erroneously thought the name of them to be *R. sphaerocarpa*, a species whose fruits are globose and measure only ca. 0.8-2.5 mm. long.

R. truncata represents those plants which have most consistently been identified as *R. obtusa* in herbaria and described in many, if not all, of the floristic manuals of the United States. There is a very marked similarity in growth habit and leaf shape between *R. teres* (*R. obtusa*) and *R. truncata*. Nuttall's original description of *N. obtusum* could apply to *R. truncata* as well as to *R. teres*. On casual examination and without careful detailed measurements, the siliques of *R. teres* appear to be twice as long as the pedicels. Thus, Nuttall's statement under *N. obtusum* "siliques . . . twice the length of the pedicels" superficially characterizes *R. teres*, but after critical measurements of the pedicels and siliques are made on numerous plants of both species and compared, Nuttall's statement actually applies to the now understood *R. truncata*. Without knowing the type of *N. obtusum*, it is understandable why *R. truncata* has been interpreted as *R. obtusa*.

The characters that distinguish *R. teres* from *R. truncata* are as follows:

Character	<i>R. teres</i>	<i>R. truncata</i>
Silique length in mm.	(5.2-) 8.5-12.5 (-17.0), ca. 3.5 times as long as the pedicels	(2.3-) 3.0-5.0 (-8.2), ca. 1.5-3.0 (-4) times as long as the pedicels
Silique apex	acute	obtuse to truncate
Seed coat (terminology follows Murley, 1951)	foveolate	colliculate
Vesicular trichomes	present	absent
Style in fruit	thick, usually over 0.3 mm. wide	slender, less than 0.3 mm. wide

Annotated specimens of these two species may be found in the following herbaria: FSU, GH, MICH, MO, MSC, ND, ND-G, NY, OS, PH, US, WIS.

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